Homework #10
Due Su. 12/03

Note: Do not use a calculator or computer to complete the following exercises. You must show all your work and put a box around your final answer to receive credit. Messy or unreadable submissions will receive no credit.

Homework will only be accepted at the beginning of class and all pages must be stapled together.

Total Points: 91

1. (0 points) Teaching Evaluation

   Reminder, you should have received an email to your RebelMail account asking to give an evaluation of the course. Please do take the ~ 3 minutes required to enter in your assessment. This provides feedback which is helpful for improving further iterations of the course.

2. (0 points) How long did it take you to complete the homework? This will not affect your grade (unless omitted) but it helps gauge the workload for this and future semesters. If you do not answer this question you will get -5 points.

3. (15 points) Decoder Logic

   Implement the following functions using a decoder and an OR gate.

   (a) (5 points) $Y = A'BC' + A'B'C + ABC$

   (b) (5 points) $W = AB + BC'$

   (c) (5 points) $Z = A'B + ABC + A$

4. (8 points) Harris 2.39

5. (15 points) Multiplexer Logic

   Implement the Boolean expression $Y = BC + A'B'C' + BC'$ using:

   (a) (5 points) a 8:1 multiplexer

   (b) (5 points) a 4:1 multiplexer and no other gates

   (c) (5 points) a 2:1 multiplexer, one AND gate, one OR gate, and one inverter.

6. (12 points) Full Adder

   (a) (8 points) Sketch a circuit schematic for a full adder using only 2-input gates. Note: the full-adder has three inputs and two outputs.

   (b) (4 points) What is the propagation and contamination delays of the full adder? Assume any 2-input gate has $t_{pd} = 30$ and $t_{cd} = 20$ ps.

7. (5 points) Harris 3.35(a)

8. (10 points) Harris 5.43. Hint: You want to choose between adding or subtracting 1 from the counter implementation in Figure 5.31.

9. (10 points) Harris Question 3.9. Note this is the Interview Question not the Exercise Problem.

10. (16 points) Harris 1.61